Chapter 15 Solution Chemistry

Mixtures - A combination of two or more substances in which they retain their individual properties and can be physically separated. (ex: salt + water)
Homogeneous - Uniform throughout. (ex: milk)
Heterogeneous - Not uniform throughout. (ex: Italian dressing)

☆ **Solutions** - Smallest particles
- Parts of a solution:
Solute - The substance that gets dissolved.
Solvent - The substance that does the dissolving.

Types of solutes:
Ionic - (Metal + Non-Metal) $NaCl_{(s)} \xrightarrow{H_2O} Na_{(aq)} + Cl_{(aq)}$
Covalent (Molecular) - (Non-Metals only) $C_6H_{12}O_{6(s)} \xrightarrow{H_2O}$ (Don't break apart)

* **Dissociation** - Ionic compounds break apart into ions when dissolving.

* **Solubility** - Amount of solute that can dissolve in a given amount of solvent at a specific temperature.
Saturated Solution - Maximum amount of solute is dissolved at a given temperature. (On the line)
Unsaturated Solution - Less than the maximum amount of solute dissolved at a given temperature. (below the line)
Super Saturated Solution - More than the maximum amount of solute dissolved at a given temperature.

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Factors that affect solubility

Temperature - Solids: for most solids as T goes up solubility goes up.

- Gases: As T goes up, solubility goes down.

Pressure - Gases only - As P increases, gas above a liquid, solubility increases.

Polarity - "like dissolves like" Polar dissolves polar, non-polar dissolves non-polar.

Molarity

Measuring concentration

Molarity (M) = $\frac{\text{How many mols of solute}}{\text{L of solution}} = \frac{M}{L}$

3.0 M HCl

↳ (1 L = 3 mol)

$250\,mL \times \frac{1\,L}{1000\,mL} = 0.25\,L$

$3.0\,M = \frac{mol}{0.25\,L}$ or $0.25\,L$

$3.0\,M \times 0.25\,L = mol$

$0.75\,mol\ HCl \times \frac{36.5\,g\ HCl}{1\,mol\ HCl} = \boxed{27.3\,g\ HCl}$

$22.6\,g \times \frac{1\,mol}{110.8\,g} = 0.2\,mol\ CaCl_2$

$M = \frac{0.2\,mol\ CaCl_2}{0.35\,L\ CaCl_2} = \boxed{0.57\,M\ CaCl_2}$